

REMARKS

The application has been reviewed in light of the Office Action dated November 28, 2004. Claims 1-40 are pending in this application, with claims 1, 9, 17, 25, 29, 33 and 37-39 being in independent form. By this Amendment, claims 4, 12 and 20 have been amended to correct obvious typographical errors therein.

Claims 4, 12 and 20 were objected to as purportedly having informalities.

By this Amendment, claims 4, 12 and 20 have been amended to correct the typographical errors therein.

Accordingly, withdrawal of the objection to claims 4, 12 and 20 is respectfully requested.

Claims 1, 9, 17, 25, 29, 33, 37, 38, 39 and 40 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over U.S. Patent 5,481,469 to Brasen et al. in view of U.S. Patent No. 5,625,803 to McNelly et al. Claims 2-8, 10-16, 18-23, 26-28, 30-32 and 34-36 were rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Brasen in view of McNelly and in further view of Official Notice.

Applicants have carefully considered the Examiner's comments and the cited art, and respectfully submit that independent claims 1, 9, 17, 25, 29, 33 and 37-39 are patentable over the cited art, for at least the following reasons.

The present application relates to estimation of electric power consumption by integrated circuits which are comprised of

basic cells and mega cells. More specifically, the application is directed to tools for estimating electric power consumption by an integrated circuit which use information collected during logic simulation.

Applicants devised improved tools for estimating power consumption of an integrated circuit which, in addition to estimating electric power consumed by basic cells, estimate electric power consumed by mega cells of the integrated circuit based on logic simulations and pre-established power consumption data. The techniques for estimating electric power consumed by the mega cells include estimating a current consumed by the mega cells by simulating logic states for each mega cell, determining an average operation frequency for each logic state, and determining an alternating current component and a direct current component for each logic state to calculate the current consumed by the mega cells.

Brasen, as understood by Applicants, is directed to automatic power vector generation for sequential circuits. Brasen discloses logic simulation only for basic cells (i.e. logic gates and the like). A block BLOCK2 (see FIGS. 7 and 8) of Brasen is the sole disclosure in Brasen of a mega-cell. The mega-cell of Brasen is said to be a RAM or ROM which has "fixed power requirements".

Since the mega-cell of Brasen has fixed power requirements, one skilled in the art would not understand Brasen to be teaching

or suggesting that logic simulation is needed for estimation of power consumption by the mega-cell.

Applicants find no teaching or suggestion in Brasen of simulating logic of a mega-cell and estimating power consumed by the mega-cell based on the logic simulation of a mega-cell, including estimating a current consumed by the mega cells by obtaining logic states for each mega cell, determining an average operation frequency for each logic state, and determining an alternating current component and a direct current component for each logic state to calculate said current consumed by the mega cells, as provided by the claimed invention of claim 1.

McNelly, as understood by Applicants, is directed to a power usage simulator which utilizes a power model that characterizes a cell's power consumption behavior as a two-part, piecewise-linear function based on signal slew rates and output load. According to the Office Action, McNelly discloses a method of calculating power dissipation of logic elements.

However, Applicants do not find teaching or suggestion in McNelly of simulating logic of a mega-cell and estimating power consumed by the mega-cell based on logic simulation, as described by the claims of this application. If the Examiner disagrees therewith, Applicants respectfully requests that the Examiner cite (by column and line number) to the specific portion of the cited art where there is basis for such disagreement.

The Office Action states that "it would have been obvious, to one of ordinary skill in the art, at the time the invention was made, to have combined the integrated circuit power estimation methods of the Brasen et al. reference with the integrated circuit power estimation methods of the McNelly et al. reference".

However, since neither Brasen nor McNelly teaches or suggests how to estimate power consumed by a mega-cell based on logic simulation of the mega-cell, it would not have been obvious to one skilled in the art, even based on a combination of the teachings of Brasen and McNelly, to estimate power consumed by a mega-cell based on logic simulation of the mega-cell, as provided by the claimed invention of claim 1.

Independent claims 9, 17, 25, 29, 33 and 37-39 are allowable over the cited art for at least similar reasons.

Accordingly, for at least the above-stated reasons, Applicants respectfully submit that independent claims 1, 9, 17, 25, 29, 33 and 37-39, and the claims depending therefrom, are patentable over the cited art.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition. The Office is hereby authorized to charge any fees that may be required in connection with this response and to credit any overpayment to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of

this application, the Examiner is respectfully requested to call the undersigned attorney.

Respectfully submitted,


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